AMENDMENTS TO THE CLAIMS

1. (original) A storage shelf that contains a number of data-storage devices interconnected to a communications medium, the storage shelf including:

a first storage-shelf-router integrated circuit and a last storage-shelf-router integrated circuit, each storage-shelf router integrated circuit including

a first communications-medium port,

a second communications-medium port,

one or more processors,

a number of disk-drive-link-port components that transmit data and commands to the number of data-storage devices through disk-drive links, and

routing logic for routing commands received through the first and second communications-medium ports to the one or more processors and for routing data received through the two or more communications-medium ports to the number of data-storage-device-link-port components; and

a number of path controller cards, each path controller card

receiving data and commands transmitted through disk-drive links from the number of data-storage-device-link-port components of one of the two storage-shelf-router integrated circuits, and, following a failure of a disk-drive link or data-storage-device-link port, receiving data and commands transmitted from one or more of the number of data-storage-device-link-port components of the other of the storage-shelf-router integrated circuits, and

transmitting the received data and commands to a data-storage device.

2. (original) The storage shelf of claim 1 wherein the storage shelf is interconnected to a first communications medium and to a second communications medium, and wherein the number of storage-shelf-router integrated circuits are linked together in a first series, the first series comprising:

the first communications medium;

the first storage-shelf-router integrated circuit connected to the first communications medium through the first communications-medium port of the first storage-shelf-router and connected to the last storage-shelf-router integrated circuit through the second communications-medium port of the first storage-shelf-router integrated circuit, the first communications-medium port of the last storage-shelf-router integrated circuit, and an internal communications medium; and

the last storage-shelf-router integrated circuit.

3. (original) The storage shelf of claim 2 wherein the number of storage-shelf-router integrated circuits are linked together in a second series, the second series comprising:

the second communications medium;

the last storage-shelf-router integrated circuit connected to the second communications medium through the second communications-medium port of the last storage-shelf-router and connected to the first storage-shelf-router integrated circuit through the first communications-medium port of the last storage-shelf-router integrated circuit, the second communications-medium port of the last storage-shelf-router integrated circuit, and the internal communications medium; and

the first storage-shelf-router integrated circuit.

4. (original) The storage shelf of claim 3 further including additional storage-shelf-router integrated circuits, each storage-shelf router integrated circuit linked together in the first series and the second series in between the first storage-shelf-router integrated circuit and the last storage-shelf-router integrated circuit, the storage-shelf-router integrated circuits each assigned a unique number, the first storage-shelf-router integrated circuit assigned a lowest unique number, the last storage-shelf-router integrated circuit assigned a highest unique number, the unique numbers assigned to the additional storage-shelf-router integrated circuits increasing along the first series and decreasing along the second series.

5. (original) The storage shelf of claim 4 wherein each additional storage-shelf-router integrated circuit having an assigned unique number is linked to a storage-shelf-router

integrated circuit with a lower unique number than the assigned unique number through the first communications-medium port of the additional storage-shelf-router, the second communications-medium port of the storage-shelf-router integrated circuit with a lower unique number than the assigned unique number, and an internal communications medium connecting the additional storage-shelf-router integrated circuit with the storage-shelf-router integrated circuit with a lower unique number than the assigned unique number.

6. (original) The storage shelf of claim 4 wherein each additional storage-shelf-router integrated circuit having an assigned unique number is linked to a storage-shelf-router integrated circuit with a higher unique number than the assigned unique number through the second communications-medium port of the additional storage-shelf-router, the first communications-medium port of the storage-shelf-router integrated circuit with a higher unique number than the assigned unique number, and an internal communications medium connecting the additional storage-shelf-router integrated circuit with the storage-shelf-router integrated circuit with a higher unique number than the assigned unique number.

7. (original) The storage shelf of claim 1

wherein the communications medium is a fibre channel arbitrated loop, and

wherein each of the number of data-storage devices is an Advanced Technology Attachment disk drive.

8. (original) The storage shelf of claim 1

wherein the communications medium is a fibre channel arbitrated loop,

wherein each of the number of data-storage devices is a Serial Advanced Technology Attachment disk drive, and

wherein the number of data-storage-device-link-port components are Serial Advanced Technology Attachment ports.

Please cancel claims 9-12.

13. (currently amended) A storage-shelf-router integrated circuit employed within a storage shelf that contains a number of data-storage devices interconnected to two communications media, the storage-shelf-router integrated circuit including:

a first communications-medium port;

a second communications-medium port;

one or more processors;

a number of data-storage-device-link-port components that transmit data and commands to the number of data-storage devices through disk-drive links; and

routing logic for routing commands received through the first and second communications-medium ports to the one or more processors and for routing data received through the first and second communications-medium ports to the number of data-storage-device-link-port components;

wherein the first communications-medium port includes a first-in-first-out buffer into which commands and data received by the first communications-medium port are written, and from which commands and data received by the first communications-medium port are accessed by the routing logic, and wherein the second communications-medium port includes a first-in-first-out buffer into which commands and data received by the second communications-medium port are written, and from which commands and data received by the first communications-medium port are accessed by the routing logic; and ~~The storage-shelf-router integrated circuit of claim 10~~

wherein the routing logic routes data accessed from the first-in-first-out buffers within the two communications-medium ports to the number of data-storage-device-link-port components by directing the data to a storage-shelf-router-integrated-circuit module that writes the data to a virtual queue within a global-shared-memory switch, from which the data can be accessed by the one of the one or more number of data-storage-device-link-port components.

Please cancel claim 14.

15. (currently amended) A storage-shelf-router integrated circuit employed within a storage shelf that contains a number of data-storage devices interconnected to two communications media, the storage-shelf-router integrated circuit including:

a first communications-medium port;

a second communications-medium port;

one or more processors;

a number of data-storage-device-link-port components that transmit data and commands to the number of data-storage devices through disk-drive links; and

routing logic for routing commands received through the first and second communications-medium ports to the one or more processors and for routing data received through the first and second communications-medium ports to the number of data-storage-device-link-port components; and

~~The storage-shelf-router integrated circuit of claim 9~~

wherein the storage-shelf-router integrated circuit is assigned a unique number and is linked, through the first communications-medium port and a first communications medium, to a first entity and is linked, through the second communications-medium port and a second communications medium, to a second entity~~,~~;

wherein the first entity is one of

a remote device external to the storage shelf, and

a storage-shelf-router integrated circuit having a unique number less than the assigned unique number~~,~~; ~~and~~

wherein the second entity is one of

a remote device external to the storage shelf, and

a storage-shelf-router integrated circuit having a unique number greater than the assigned unique number; and

~~The storage-shelf-router integrated circuit of claim 14~~

wherein the storage-shelf-router integrated circuit further includes a routing table that lists, for each data-storage device interconnected through the number of data-storage-device-link-port components to the storage-shelf-router integrated circuit, a first-

communications-medium address associated with the data-storage device, a second-communications-medium address associated with the data-storage device, and additional information related to the data-storage-device addresses supported by the data-storage device.

16. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a command message received through the first communications-medium port, the routing logic

routes the command message to one of the one or more processors when a destination address of the command message matches a first-communications-medium address associated with a data-storage device in the routing table,

routes the command message to the second communications-medium port when the destination address of the command message does not match a first-communications-medium address associated with a data-storage device in the routing table, and the second entity is not a remote device external to the storage shelf,

routes the command message to the first communications-medium port when the destination address of the command message does not match a first-communications-medium address associated with a data-storage device in the routing table, and the second entity is a remote device external to the storage shelf, and

routes the command message to one of the one or more processors when the routing logic determines that the command message needs error handling.

17. (original) The storage-shelf-router integrated circuit of claim 16 wherein the routing logic determines that the command message needs error handling when the routing logic accesses additional tables within the storage-shelf-router integrated circuit and determines that the entity which sent the command message is not authorized to direct a command to a data-storage device interconnected to the storage-shelf router.

18. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a data message received through the first communications-medium port, the routing logic

routes the data message to one of the number of data-storage-device-link-port components when a destination address of the command message matches a first-communications-medium address associated with a data-storage device in the routing table,

routes the data message to the second communications-medium port when the destination address of the command message does not match a first-communications-medium address associated with a data-storage device in the routing table, and the second entity is not a remote device external to the storage shelf,

routes the data message to the first communications-medium port when the destination address of the command message does not match a first-communications-medium address associated with a data-storage device in the routing table, and the second entity is a remote device external to the storage shelf, and

routes the data message to one of the one or more processors when the routing logic determines that the data message needs error handling.

19. (original) The storage-shelf-router integrated circuit of claim 18 wherein the routing logic determines that the data message needs error handling when the routing logic accesses additional tables within the storage-shelf-router integrated circuit and determines that no context has been created within shared memory during processing of a previous command message for a data transfer operation, all or a portion of which involves the data message and when the routing logic accesses additional tables within the storage-shelf-router integrated circuit and determines that the entity which sent the command message is not authorized to direct data to a data-storage device interconnected to the storage-shelf router.

20. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a status message received through the first communications-medium port, the routing logic

routes the status message to the second communications-medium port when the second entity is not a remote device external to the storage shelf, and

routes the status message to the first communications-medium port when the second entity is a remote device external to the storage shelf.

21. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a storage-shelf-internal-management message received through the first communications-medium port, the routing logic

routes the storage-shelf-internal-management message to one of the one or more processors when a destination address of the storage-shelf-internal-management message matches the unique number assigned to the storage-shelf-router integrated circuit,

routes the storage-shelf-internal-management message to the second communications-medium port when the destination address of the storage-shelf-internal-management message is greater than the unique number assigned to the storage-shelf-router integrated circuit and the second entity is not a remote device external to the storage shelf, and

routes the storage-shelf-internal-management message to one of the one or more processors when the routing logic determines that the storage-shelf-internal-management message needs error handling.

22. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a command message received through the second communications-medium port, the routing logic

routes the command message to one of the one or more processors when a destination address of the command message matches a second-communications-medium address associated with a data-storage device in the routing table,

routes the command message to the first communications-medium port when the destination address of the command message does not match a second-communications-medium address associated with a data-storage device in the routing table, and the first entity is not a remote device external to the storage shelf,

routes the command message to the second communications-medium port when the destination address of the command message does not match a second-communications-medium address associated with a data-storage device in the routing table, and the first entity is a remote device external to the storage shelf, and

routes the command message to one of the one or more processors when the routing logic determines that the command message needs error handling.

23. (original) The storage-shelf-router integrated circuit of claim 22 wherein the routing logic determines that the command message needs error handling when the routing logic accesses additional tables within the storage-shelf-router integrated circuit and determines that the entity which sent the command message is not authorized to direct a command to a data-storage device interconnected to the storage-shelf router.

24. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a data message received through the second communications-medium port, the routing logic

routes the data message to one of the number of data-storage-device-link-port components when a destination address of the command message matches a second-communications-medium address associated with a data-storage device in the routing table,

routes the data message to the first communications-medium port when the destination address of the command message does not match a second-communications-medium address associated with a data-storage device in the routing table, and the first entity is not a remote device external to the storage shelf,

routes the data message to the second communications-medium port when the destination address of the command message does not match a second-communications-

medium address associated with a data-storage device in the routing table, and the first entity is a remote device external to the storage shelf, and

routes the data message to one of the one or more processors when the routing logic determines that the data message needs error handling.

25. (original) The storage-shelf-router integrated circuit of claim 24 wherein the routing logic determines that the data message needs error handling when the routing logic accesses additional tables within the storage-shelf-router integrated circuit and determines that no context has been created within shared memory during processing of a previous command message for a data transfer operation, all or a portion of which involves the data message and when the routing logic accesses additional tables within the storage-shelf-router integrated circuit and determines that the entity which sent the command message is not authorized to direct data to a data-storage device interconnected to the storage-shelf router

26. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a status message received through the second communications-medium port, the routing logic

routes the status message to the first communications-medium port when the first entity is not a remote device external to the storage shelf, and

routes the status message to the second communications-medium port when the first entity is a remote device external to the storage shelf.

27. (original) The storage-shelf-router integrated circuit of claim 15 wherein, when the routing logic accesses a storage-shelf-internal-management message received through the second communications-medium port, the routing logic

routes the storage-shelf-internal-management message to one of the one or more processors when a destination address of the storage-shelf-internal-management message matches the unique number assigned to the storage-shelf-router integrated circuit,

routes the storage-shelf-internal-management message to the first communications-medium port when the destination address of the storage-shelf-internal-management message is less than the unique number assigned to the storage-shelf-router integrated circuit and the first entity is not a remote device external to the storage shelf, and

routes the storage-shelf-internal-management message to one of the one or more processors when the routing logic determines that the storage-shelf-internal-management message needs error handling.

Please cancel claims 28-29.